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VTEC rise may be linked to private wells

A worrying concentration of Verotoxigenic *E. coli* (VTEC) notifications has been observed over recent weeks in HSE-South. An earlier peak in May was accounted for by two family clusters. However, over half of the region's 25 VTEC notifications so far this year have occurred in the eight-week period since late June (Fig 1). In that period, thirteen cases of VTEC (8 confirmed / 5 probable) - comprising 4 sporadic cases and 3 family clusters - have been notified. All except two cases utilised a home drinking water supply from a private well.

Investigators are concerned that exposure to private well drinking water may be a primary risk factor in most of these June-Aug instances. A family VTEC cluster of four cases, all symptomatic, had a private well in use which was found to be microbiologically contaminated. VTEC O157 was isolated from a sample of that well water. Wells in two other instances were microbiologically contaminated although VTEC was not detected. Results in other instances are pending.

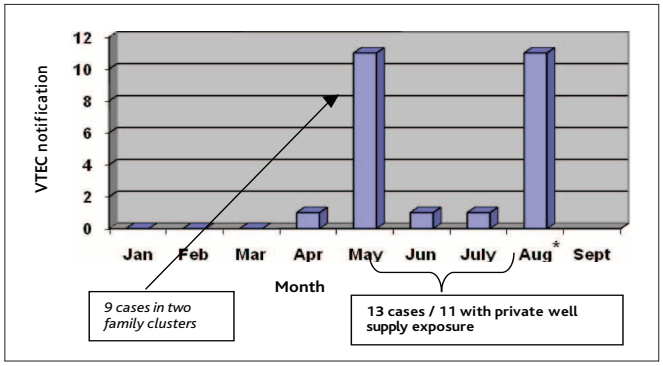
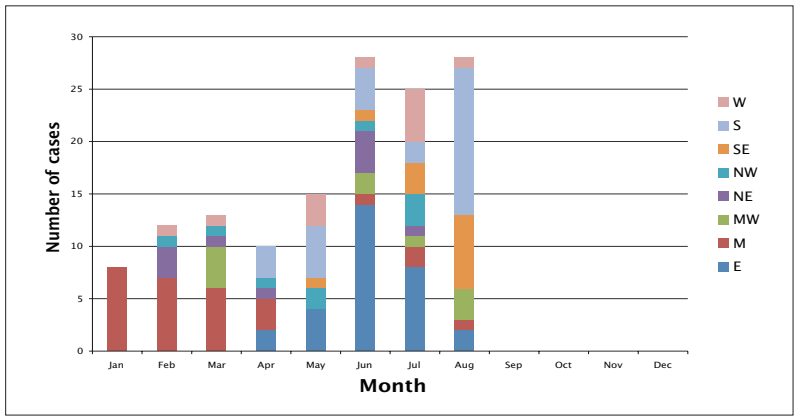


Fig 1. VTEC Notifications HSE-South (Cork & Kerry) 2008
**up until 20/08/08*

Excessive rainfall this summer has resulted in unprecedented high water table levels, excessive runoff and flooding. The potential for microbiological contamination of drinking water is increased. Private water supplies have been repeatedly highlighted as a concern in relation to VTEC infection in Ireland (HPSC Annual Reports 2004/5/6). There is a need for maximum vigilance in the surveillance of potentially waterborne infections at this time.

MB O' Sullivan, A Brennan. HSE-South (Cork & Kerry)



Provisional number of VTEC cases notified by month and HSE-area, Ireland Jan 1st to Aug 25th 2008

VTEC notifications nationally have also risen in 2008, with 139 cases notified year-to-date compared with approximately 70-90 cases reported in the equivalent time periods of 2006-2007. Most recently, this increase has been most prominent in the South and the South East. So far this year, 30% of cases are reported to have occurred where private wells are in use. While not all cases in private well households are related to water consumption, HPSC strongly advises all private well owners to make sure that their wells are maintained appropriately.

In times of heavy rainfall users may need to consider boiling their water or taking other appropriate measures particularly if vulnerable people such as children, the elderly or immunocompromised persons are drinking the water and particularly if the householder notices a change in the character of the water at such times e.g. colour/taste/odour. Further advice on private wells is available from both HSE Environmental Health Service and local authorities.

Epidemiology of Hepatitis B in Ireland

Introduction

Hepatitis B virus is a common cause of morbidity and mortality, with more than 350 million people chronically infected worldwide. Transmission of the virus is through contaminated blood and body fluids and hepatitis B infection occurs mainly in well defined risk groups such as babies born to infected mothers, sexual or household contacts of infected people, injecting drug users (IDUs), heterosexuals with multiple partners, and men who have sex with men (MSM).

Many cases, particulary adults, are asymptomatic in the acute phase. There is a high probability of developing chronic infection if hepatitis B is acquired in infancy or early childhood. Ninety percent of infants infected at birth and 20-50% of children infected between one and five years become chronically infected, compared to 1-10% of those who acquire hepatitis B later in life. Approximately 15-40% of people who are chronically infected will ultimately develop cirrhosis, liver failure or hepatocellular carcinoma (HCC).[1]

In countries of high endemicity, infection is usually acquired perinatally or in early childhood.[1] Ireland is a low endemicity country and most cases acquired in Ireland are probably acquired sexually in early adulthood when there is a high probability of clearing the virus. The epidemiology of hepatitis B in Ireland has changed significantly in recent years with changes in immigration patterns.

Methods

Sources of data for this report include statutory notifications to the Health Protection Surveillance Centre (HPSC), prevalence studies and screening programmes, the Department of Enterprise, Trade and Employment (DETE), the Office of the Refugee Applications Commissioner (ORAC), the Central Statistics Office (CSO), the Irish Blood Transfusion Service (IBTS) and the National Cancer Registry of Ireland (NCRI).

Results

Hepatitis B statutory notifications

The number of hepatitis B notifications to HPSC increased almost 30-fold between 1997 (n=31) and 2007 (n=863) (figure 1).

Hepatitis B notifications, 2004 to 2007

Improvements were made to the hepatitis B notification system in January 2004 with the introduction of mandatory laboratory reporting and the differentiation of acute and chronic cases. Between 2004 and 2007, 3,263 cases of hepatitis B were notified to HPSC. Acute/chronic status was reported for 86% (n=2,819) and 90% of these were chronic (n=2,545).

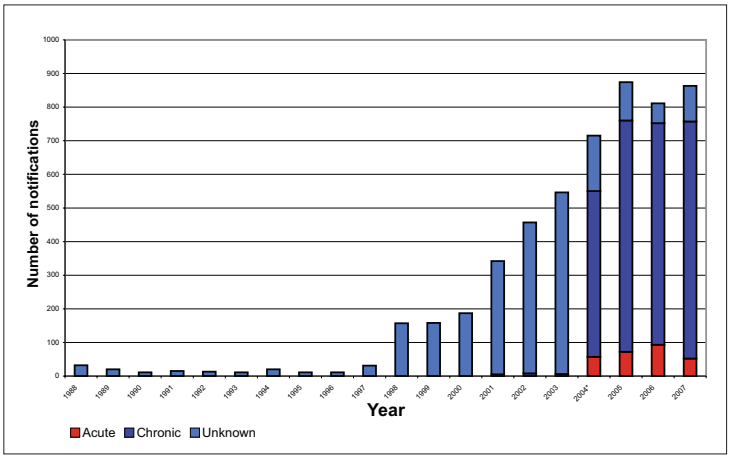


Figure 1. Number of cases of hepatitis B notified, 1988 – 2007

*Laboratories required to notify HBV and acute/chronic status reported routinely from January 1st 2004

Acute cases 2004-2007

Seventy-seven percent (n=211) of the acute cases notified between 2004 and 2007 were male, 21.5% (n=59) were female and sex was unknown for four cases. The highest notification rates were in young to middle-aged adults, with 69% (n=189) of cases aged between 20 and 44 years (figure 2).

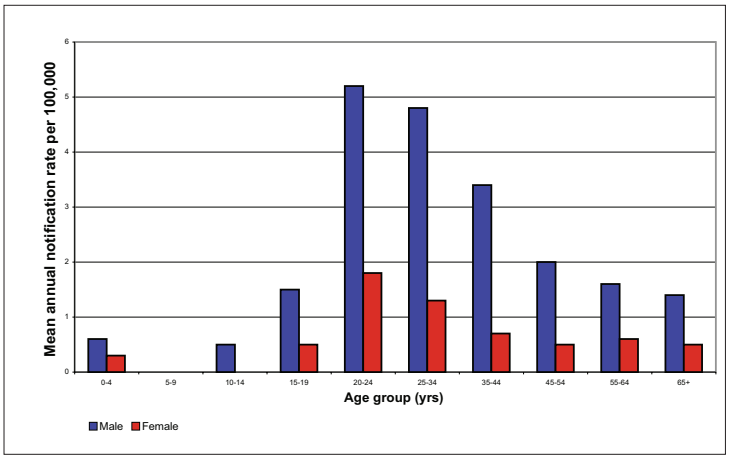


Figure 2. Mean annual age- and sex-specific notification rates for acute cases of hepatitis B, 2004-2007

Where the reason for testing was known (n=195/274), 71% (n=138) of acute cases notified between 2004 and 2007 were tested because they were symptomatic. Risk factor information was available for 74% (n=203/274). Of these, 57% (n=115) were likely to have been sexually acquired and an additional 11% (n=23) were born in hepatitis B endemic countries or were asylum seekers. Of the sexually acquired cases, 56 were MSM, 50 were heterosexual and sexual orientation was unknown for the remaining nine. Where country of birth was known (n=185/274), 82% (n=151) of acute cases were born in Ireland.

Chronic cases, 2004-2007

The sex distribution of chronic cases was more even than that of acute cases. Where sex was known, 54% (n=1,308) of chronic cases were male and 46% (n=1,118) were female. The majority of chronic cases were also young to middle-aged adults, with 82% (n=2,090) aged between 20 and 44 years (figure 3).

Enhanced data were more limited for chronic cases. Where the reason for testing was known (n=908/2,545), 41% (n=369) of chronic cases were identified through voluntary health screening programmes for asylum seekers and a further 29% (n=259) were diagnosed as a result of antenatal screening programmes in maternity hospitals. Where information on country of birth or asylum seeker status was available (n=789/2,545), 90% (n=707) of chronic cases were either born in a country where hepatitis B is endemic or were asylum seekers.

Hepatitis B prevalence data

The prevalence of hepatitis B infection in the general population in Ireland is low. Serum hepatitis B surface antigen (HBsAg) is a marker for current acute or chronic infection. Serological surveillance was carried out in 2003 as part of the European Sero-Epidemiology Network project and a HBsAg prevalence of 0.1% was found in the Irish samples tested (ESEN-2 unpublished data). Blood donor screening results also indicate a low prevalence in the general population. The

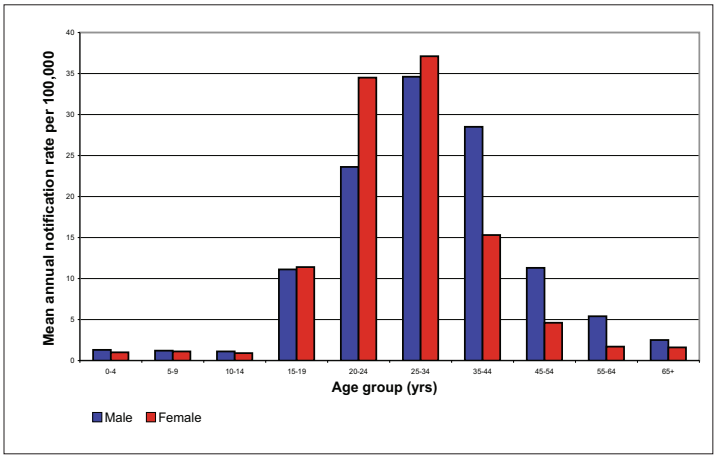


Figure 3. Mean annual age- and sex- specific notification rates for chronic cases of hepatitis B, 2004-2007

IBTS tested 207,015 first time blood donors between 1997 and 2006 and found a HBsAg prevalence of 0.014% (personal communication IBTS, February 2007).

However, hepatitis B is more prevalent in certain high-risk sub-groups of the population such as people who have immigrated to Ireland from intermediate (2-7% HBsAg prevalence) or high (≥8% HBsAg prevalence) endemicity countries and IDUs. Thirty-five to forty percent of all new asylum applicants are screened for communicable disease in the HSE E. A review of the screening service in this area was carried out in 2004 and found that of those tested for HBsAg between 1999 and 2003, 5% were positive.[2] Routine antenatal testing for HBsAg was introduced in the Rotunda in 1998. Uptake was almost 100% and 16,222 pregnancies were screened between January 1998 and June 2000. They found a HBsAg prevalence of 4.2% in non-EU women and 0.03% in Irish women tested.[3]

A cross-sectional study of 316 opiate users attending 21 addiction treatment centres in the HSE E was carried out between December 2001 and January 2002 and found a HBsAg prevalence of 2% in this population.[4]

Immigration data

The prevalence of hepatitis B in Ireland is influenced by the immunisation policies and the prevalence of hepatitis B in the country of birth of immigrants to Ireland.

Almost 60,000 (58,185) asylum applications were received by ORAC between 2000 and 2007. Ninety-five percent of applicants were from countries with intermediate or high hepatitis B endemicity. The number of work permits issued by DETE has also increased substantially in recent years, with 125,312 new permits issued between 2000 and 2007. Seventy-two percent of recipients were from countries of hepatitis B high or intermediate endemicity.

Hepatocellular carcinoma data

HCC is the most common form of primary liver cancer and the most important causes worldwide are chronic infection with hepatitis B and hepatitis C. Four hundred and four cases of HCC were registered with the NCRI between 1994 and 2006. Seventy nine percent were males and the average age was 66 years for males and 62 years for females (personal communication: NCRI, July 2007).

The proportion of HCC cases that were due to hepatitis B is unknown. However a systematic review of all published data on the prevalence of hepatitis B and C infection among HCC cases found that of 4,308 European cases of HCC, 23.1% were positive for HBsAg and a further 6.5% were positive for both HBsAg and hepatitis C antibodies. One of the studies included in this was set in the UK and found that of 80 cases of HCC, 16.3% were positive for HBsAg and 2.5% were positive for both HBsAg and anti-hepatitis C antibodies.[5] From these, we would expect that between 19 and 30% of Irish HCC cases are infected with hepatitis B.

The CSO reported an underlying cause of death of primary liver cancer for 355 people between 1994 and 2006 (personal communication: CSO, August 2008).

Discussion

The epidemiology of hepatitis B has changed significantly in Ireland in recent years with changes in immigration patterns. Sexual exposure has remained the predominant risk factor for acute cases but the vast majority of cases being notified now are chronic cases. Most have immigrated to Ireland, having contracted hepatitis in their countries of birth.

These changes have implications for service provision as many of the current carriers have probably been infected since infanthood or early childhood and are at risk of developing liver failure, cirrhosis or hepatocellular carcinoma. Without intervention, new babies born to these parents are at high risk of becoming chronically infected perinatally or horizontally through household contact.

Changes to hepatitis B prevention and control strategies have been implemented. Hepatitis B is a vaccine-preventable disease and in 1992 the World Health Organization (WHO) recommended that the hepatitis B vaccine be included in routine immunisation programmes in all countries by 1997. The immunisation policy in Ireland has been based on targeting people who fall into defined risk groups for vaccination. This immunisation policy is set to change in September 2008 with the implementation of the Immunisation Guidelines for Ireland (http://www.ndsc.ie/hpsc/A-Z/VaccinePreventable/Vaccination/Guidance/). In addition to the current targeted immunisation programme, all infants will be offered the hepatitis B vaccine as part of the routine childhood immunisation schedule at 2, 4, and 6 months.

In addition, all Irish maternity hospitals now routinely carry out antenatal screening for hepatitis B and follow up to babies born to positive mothers. The HSE has also prepared information leaflets for people with hepatitis B and their family members in several languages (http://www.ndsc.ie/hpsc/A-Z/HepatitisHIVAIDSandSTIs/HepatitisB/Factsheets/).

These measures will go a long way towards preventing new hepatitis B infections in infants and young children. However, additional work must be done to ensure that adult risk groups are targeted effectively and immunised.

Niamh Murphy, Lelia Thornton, HPSC

Acknowledgements

We wish to thank all of the following for their contribution to this report and for providing the data contained in it: directors of public health and their staff; notifiers of hepatitis B; CSO; ORAC; NCRI; DETE and IBTS.

References available on request.

An outbreak of gastroenteritis affecting residents in Ireland, the United Kingdom, Finland, France and Sweden is currently being investigated by an international outbreak control team led by the Health Protection Surveillance Centre in Ireland.

On 15th July the Health Protection Surveillance Centre was informed by the National Salmonella Reference Laboratory (NSRL) of an increase in *S.* Agona isolates over the previous 3 weeks. Colleagues in United Kingdom (UK) Surveillance Centres were informed on the 16th July and reported that there was also a recent increase in isolates in the UK. Alerts were posted through the Food and Waterborne Disease Network (European Centre for Disease Control) and also the European Union (EU) Early Warning and Response System (EWRS) on 23rd July.

Microbiological results

Microbiological investigations demonstrate *S.* Agona isolates with indistinguishable PFGE profile SAGOXB.0066 in isolates from cases, and food samples from a specific food producer. The specific strain of *S.* Agona has been detected in a number of meat products from a food plant in Ireland and in meat products collected from outlets supplied by the plant in both Ireland and the United Kingdom. In addition, this strain of *S.* Agona has been detected in environmental samples from the side of the plant dealing with uncooked food.

Case definition

Confirmed: *S.* Agona with PFGE SAGOXB.0066 profile
Probable: *S.* Agona PT 39
Possible: *S.* Agona where PT unknown or PFGE profile unknown in Ireland and the United Kingdom

To date, there are 144 cases in total meeting the above case definition. Of these, 140 are PFGE confirmed cases with one probable and three possible cases awaiting definitive analysis. The most recent date of onset reported is 7th August 2008. Cases range in age from 3 months to 79 years with a median age of 27 years. The majority of cases are in males i.e. 57% (M = 82 cases, F= 62 cases). To date, 19 cases (13%) are known to have been/are currently hospitalised. There has been one death associated with the outbreak.

Epidemiological studies

A case control study in Ireland (11 Irish cases with 33 matched controls) has demonstrated a highly significant association between illness and consumption of made to order sandwiches in outlets supplied by the implicated company.

Control

The company concerned has ceased production on the implicated line since August 1st and a recall of products from this line has been put in place. As it may take several weeks from onset of illness to the results of detailed molecular analysis more cases fitting the case definition may be diagnosed and the epidemiological situation continues to be monitored.

Darina O'Flanagan, Martin Cormican (NSRL)
on behalf of the Outbreak Control Team.

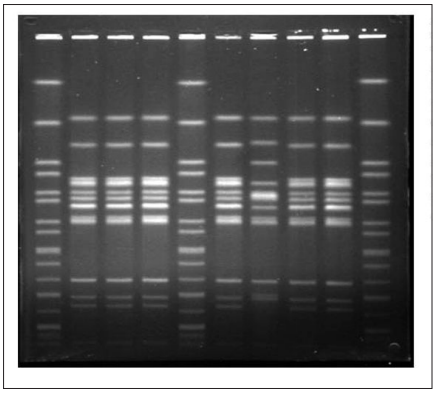


Figure 1 Image of Pulsed Field Gel Electrophoresis of 7 S. Agona isolates digested with XbaI. Lanes 1, 5 and 10 are the S. Branderup control. Lanes 2,3,4, 6, 8 and 9 are the S. Agona SAGOXB.0066 strain from patients and food sources. Lane 7 represents an unrelated S. Agona isolate

SUMMARY OF LABORATORY DATA TO DATE – HUMAN CASES

Table 1.Number of confirmed, probable, and possible S. Agona cases by counti February 1st to August 25th 2008

Country	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
England	2	0	8	13	20	39	1	**83**
Finland	0	0	0	1	0	0	0	**1**
France	0	0	0	0	0	1	0	**1**
Ireland	0	0	0	0	2	8	1	**11**
N. Ireland	0	0	0	1	0	0	1	**2**
Scotland	0	0	0	4	13	13	4	**34**
Sweden	0	0	0	0	0	1	1	**2**
Wales	0	0	0	3	3	3	1	**10**
Total	**2**	**0**	**8**	**22**	**38**	**65**	**9**	**144**

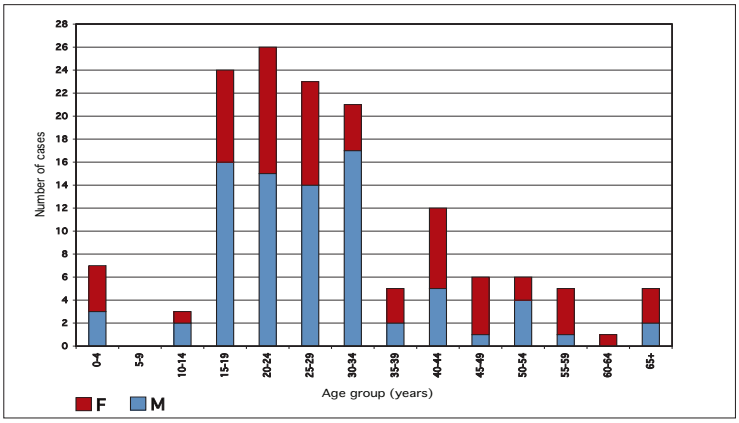


Figure 2: Reported number of confirmed, probable, and possible S. Agona cases by age and gender . February 1st to August 25th 2008 at 15:00 (n=144)

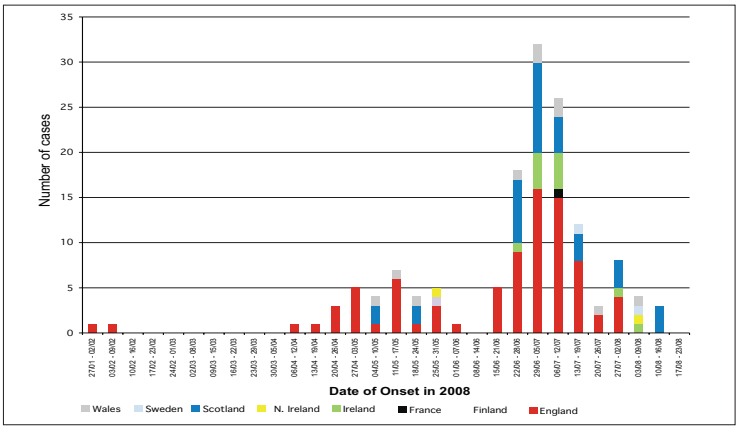


Figure 3: Reported number of confirmed, probable, and possible S. Agona cases by date of onset and country
February 1st to August 25th 2008 at 15:00
Where the date of onset is unknown, the specimen date or a calculated date (lab receipt date-mean diff of lab receipt-onset) is used. Date of Onset unknown for n=26 cases.

Referemces:
1. O'Flanagan D, Cormican M, McKeown P, Nicolay N, *et al*. A multi-country outbreak of *Salmonella* Agona, February-August 2008. *Euro Surveill*. 2008; **13**(33): pii=18956. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?Articleld=18956.

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